

Claims

What is claimed:

1. A photocurable composition comprising following components:
 - (a) an epoxy component containing one or more epoxy compound(s);
with from 0 to less than 30% preferably to less than 28% more preferably to less than 20% by weight of the epoxy component being of glycidyl type,
 - (b) a (meth)acrylate component containing one or more multifunctional (meth)acrylates which:
 - (i) contain no hydroxyl groups; or
 - (ii) contain hydroxyl groups, but have a hydroxyl equivalent weight of 500 grams or less, preferably a hydroxyl equivalent weight of about 300 grams or less;and preferably the (meth)acrylate component forms less than 20% by weight of the total composition,
 - (c) a component containing two or more hydroxyl groups, being preferably not a polyester compound, being preferably not an acrylated polyol, and preferably is a polyether polyol compound
 - (d) a cationic photoinitiator; and
 - (e) a free radical photoinitiator.
2. The photocurable composition of claim 1, wherein the one or more multifunctional (meth)acrylates comprise a pentaerythritol (meth)acrylate, comprising preferably pentaerythritol triacrylate and/or pentaerythritol tetraacrylate, more pentaerythritol triacrylate.

3. The photocurable composition according to any preceding claim, wherein the one or more multifunctional (meth)acrylates comprise a dipentaerythritol (meth)acrylate, preferably dipentaerythritol hexaacrylate.

4. The photocurable composition of any preceding claim, wherein the one or more multifunctional (meth)acrylates comprise an alkoxylated acrylate, preferably a trimethylolpropane ethoxylated triacrylate.

5. A photocurable composition comprising following components:

- (a) a cationically curable component preferably formed from one or more epoxy compound(s)
- (b) a (meth) acrylate component containing, preferably, formed from, dipentaerythritol hexaacrylate,
- (c) a polyol component comprising a polyol compound containing two or more hydroxyl groups, preferably polyether polyol,
- (d) a cationic photoinitiator; and
- (e) a free radical photoinitiator.

6. A photocurable composition comprising following components:

- (a) a cationically curable component preferably formed from one or more epoxy compound(s)
 - (b) a (meth)acrylate component containing alkoxylated acrylate, preferably free of hydroxyl groups, more preferably a trimethylolpropane ethoxylated triacrylate,
- the (meth)acrylate component forming preferably less than 20% by weight of the total composition,

- (c) a polyol component comprising a polyol compound containing two or more hydroxyl groups, preferably polyether polyol,
- (d) a cationic photoinitiator; and
- (e) a free radical photoinitiator.

- 7. The photocurable composition of any preceding claim wherein component (c) has a molecular weight of 1500 or less, preferably of about 260 or less.
- 8. The photocurable composition of any preceding claim, wherein the composition comprises about 3 to about 10 percent by weight of component (b).
- 9. The composition of any preceding claim, wherein the composition does not comprise multifunctional (meth)acrylates other than those defined by component (b)
- 10. The photocurable composition of any preceding claim, wherein said composition after cure has a yellow index/inch value of less than 90, preferably less than 80.
- 11. A process for producing a three dimensional article in sequential cross-sectional layers in accordance with a model of the article, the process comprising the steps of:
 - (1) forming a first layer of the photocurable composition of claim 1, 5 or 6;
 - (2) exposing said first layer to actinic radiation in a pattern corresponding to a respective cross-sectional layer of the model sufficient to harden the first layer in the imaged area;
 - (3) forming a second layer of said composition above the hardened first layer;

(4) exposing said second layer to actinic radiation in a pattern corresponding to a respective cross-sectional layer of the model sufficient to harden the second layer in the imaged area; and

(5) repeating steps (3)-(4) to form successive layers as desired to form said three dimensional article.

12. A process for forming a three-dimensional article in sequential cross-sectional layers in accordance with a model of the article, the process comprising the steps of: depositing droplets of the photocurable composition of claim 1, 5 or 6 onto a substrate in a pattern corresponding to a cross-sectional layer of the model so that adjacent droplets merge together; repeating these steps to form successive layers; and applying actinic radiation to cure the photocurable composition, pixel-by-pixel, line-by-line, layer-by-layer, after several layers have been formed and/or after all desired layers have been formed.

13. A three-dimensional article produced by the process of claim 11 or claim 12.